Wrong gas: Risk of intra-abdominal fire during laparoscopic surgery

Sir,

Different gases have been proposed for creating pneumoperitoneum with its own advantages and limitations. Carbon dioxide has been proposed to be one of the safe gases for pneumoperitoneum during laparoscopic surgery. Oxygen has been found to aid combustion. There have been many reports of intra-abdominal combustion by use of incorrect gas due to the wrong identification of gas cylinder.[1,2] We report a case where oxygen insufflation for creating pneumoperitoneum was accidentally done due to wrong connection of insufflating system to oxygen gate on the pendant, despite the outlets having a colour coding, a gas name and a definite shape.

A 26 year old woman presented with ruptured ectopic pregnancy for laparoscopic repair of fallopian tubes in the emergency operating room at midnight. Standard anaesthetic induction technique was followed and anaesthesia was maintained with fentanyl, isoflurane and atracurium as per requirement. Approximately 25 minutes after the start of the surgery, multiple sparks arose from the tip of laparoscopic hook (while controlling a bleeder inside the insufflated abdomen) in an unusual manner and that forced to withdraw the instrument quickly. The electrocautery settings were checked for appropriate levels for that particular procedure. Shortly after re-introducing the cleaned laparoscopic hook, the sparking phenomenon occurred again. After a thorough checking of laparoscopic system, including the electrocautery and the gas supply, the exact cause was identified as human error in connecting the insufflating system to wrong gas gate (Oxygen (O_2), instead of carbon dioxide (CO_2)) on a pendant in the operation theatre.[3] The current surgical practice is to use 100% carbon dioxide, because it is not combustible and thus will not create an explosion even if the electrocautery generate a spark.[1] After proper gas connection, the surgery was carried out to the end, successfully without any disruption.

In the operating room, on pendant, the outlet for carbon dioxide is identified by colour (gray), gas name (carbon dioxide (CO_2)) and shape (hexagonal).[4] [Figures 1 and 2] while the oxygen outlet is identified by colour (white), gas name (oxygen) and shape (hexagonal). Due to similar shapes for these gases, accidental fitting of wrong gas happened in our case. To our surprise, even in the presence of pin index configuration, which is specific for carbon dioxide, failed in preventing the wrong connection at the gas outlet on the pendant. In our hospital settings, the operating room support personnel (nurse / technician) are usually assigned for connection of insufflating device to the source of gases which is finally supervised by anaesthesiologists.

This type of human error happened due to many reasons. First, the shape of both outlets (Schrader sockets) for carbon dioxide and oxygen are same, that is, hexagonal in which the same remote probe of insufflator getting easily attached. Secondly, as the timing of operation was around mid of the night (where the possibilities of human error is supposed to be very high, so need of supervision at this point

Figure 1: Gray colour hexagonal socket for carbon dioxide outlet

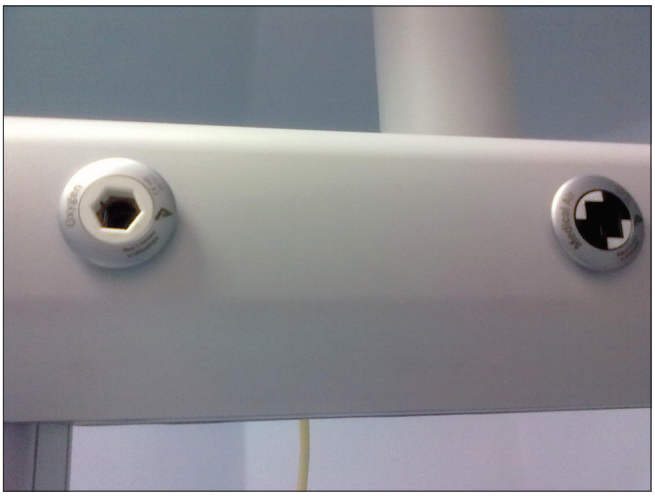

Figure 2: White colour hexagonal socket for oxygen outlet

of time is of paramount important). Thirdly, lack of proper training of support staff of operating room (for handling and operational procedures of different equipments or instruments) during whole procedure.[5] Above all, none of our operating room support staff were aware of the potential complications associated with this type of accident. This incident prompted our institute to provide training to all operating room personnel and to alert them of this potential hazard, which followed a strict check in procedure for gas set up and connection used in the operation theatre before initiating a case. The lack of documentation in the literature search of similar disaster infers that the human error made in our case represents a rare breach in existing preventive measures.

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Quick response code	Website: www.ijaweb.org
	DOI: 10.4103/0019-5049.104598